AIDS awareness and VCT behaviour: An application of the integrated model of behaviour prediction

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In order to limit the expansion of the HIV and AIDS epidemic in South Africa, it is important to develop targeted prevention strategies. The voluntary HIV counselling and testing (VCT) programme appears to be effective for preventing the spread of the HI virus. This study adapted guidelines of the integrated model of behaviour prediction (IMBP) into a questionnaire and examined the extent to which it predicts behaviour. A sample of 92 sports team members from Limpopo ranging from 14 to 30 years of age completed the questionnaire. Results suggested that beliefs about the outcomes of behaviour and beliefs about the expectations of others had a direct influence on the intention to undergo HIV counselling and testing. Efficacy beliefs, namely beliefs that there are factors that can facilitate behaviour, can lead to actual testing behaviour if accompanied by self-efficacy. Knowledge, intention and stigma are not related to VCT behaviour. Findings show that some constructs influence intention and test behaviour, but in ways not predicted by the model. Thus, the adequacy of the IMBP to determine HIV and AIDS-preventative behavioural intentions is questioned.

Dit is belangrik om doelgerigte voorkomende strategieë te ontwikkel om die verspreiding van MIV en VIGS in Suid Afrika te bekamp. Die vrywillige MIV-voorligtings- en toetsingsprogram (VVT) blyk effektief te wees om die verspreiding van die MI virus te stuit. In hierdie studie is 'n vraelys ontwikkel wat op die geïntegreerde model van gedragsvoorspelling (GMG) gebaseer is. Die studie ondersoek die mate waarin die GMG gedrag kan voorspel. 'n Steekproef van 92 sport spanlede van Limpopo tussen die ouderdomme van 14 tot 30 jaar, het die vraelys voltooi. Resultate toon dat oortuigings oor die uitkoms van gedrag en oortuigings oor die verwagtings van ander 'n direkte invloed uitoefen op die intensie om VVT te ondergaan. Oortuigings dat daar faktore is wat gedrag kan fasiliteer het 'n invloed op die intensie slegs as 'n mens ook die gemak waarmee gedrag uitgevoer kan word insien. Kennis, intensie en stigma is nie verwant aan toetsgedrag nie. Die bevindinge toon dat sommige konstrukte wel intensie en toetsgedrag beïnvloed, maar nie op die manier wat die model voorstel nie. Resultate bevraagteken die vermoë van die GMG om MIV en VIGS- voorkomende gedragsintensies te bepaal.

Introduction

Background and context

The human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) epidemic is spreading at a disproportionate rate worldwide. By the end of 2001, there were approximately 29 million people in the world living with HIV or AIDS (UNAIDS 2009). The latest available information indicates that at the end of 2008 an estimated 33.4 million people were living with HIV or AIDS (UNAIDS 2009). South Africa is one of the countries with the largest and fastest growing HIV and AIDS epidemic in the world. In 2008, 5.7 million people in South Africa were infected with HIV, which is more than 12% of the population (UNAIDS 2008, 2009).

Although it is too late to turn back the tide of the pandemic, it is possible to influence the future course and nature of this pandemic through targeted prevention strategies, thus limiting its expansion. A major concern is that despite the alarming statistics, many South Africans have not yet embraced the prevention message. Often they have received mixed messages about HIV and AIDS (Van Dyk 2005). For example, the erstwhile president of South Africa was sceptical that HIV causes AIDS and challenged the effectiveness of anti-retroviral drugs in fighting the disease. Assuming that populations are informed to some degree by the leadership of their countries, this standpoint is alarming. In the fight against HIV and AIDS, political commitment is very important (Stephenson 2000). In December 2006, the South African government released the outlines of a new plan to fight the disease over the next five years but, at that stage, *The Economist* (2006) pointed out that the plan was still vague and short on targets. However, progress has been made since then and South Africa now has one of the largest antiretroviral programmes in

the world (UNAIDS 2009). Planning for health care is also steadily improving, partly because of an improvement in the quality of HIV and AIDS information. For example, improved reporting on mortality since 1996 enabled investigators to unravel the complexity of HIV-related deaths (Harrison 2009).

One of the other barriers that needs to be overcome is the stigma of AIDS. Stigma and the fear of stigma are well-recognised barriers to HIV testing, disclosure and treatment seeking (Jewkes 2006; Kalichman *et al*. 2005). Reducing stigma is very important, but it is also very complex and not possible to realise in the short term. It is nevertheless essential to concentrate on effective prevention strategies in the meantime, especially with regards to young people as they are the ones generally swept into this pandemic. In 2000, the virus was spreading most rapidly amongst young South Africans, with more than 60% of new infections occurring amongst people between 15 and 25 years of age (Stephenson 2000). It was estimated that in 2002, around 15.5% of South Africans between the ages of 15 and 49 were infected with HIV, and approximately 6% of youths 15 to 19 years old were infected (Bryan, Kagee & Broaddus 2006). The prevalence rate has stabilised at approximately 11% for persons above 2 years of age in 2008, whilst the rate for the 15 to 19 year age group was still between 5% and 7% (Harrison 2009).

Voluntary HIV counselling and testing (VCT) is a major strategy for prevention of HIV infection and AIDS. The different forms of VCT are traditional or client-initiated VCT, mobile VCT, routine or provider-initiated VCT and home-based VCT (Matovu & Makumbi 2007). Although all forms have the same content, they differ in terms of access. Traditional VCT depends on the client going to a VCT facility, whilst the other forms address access barriers by going to the client. Traditional VCT is still the basic model for VCT and is based on the assumptions that governments and other institutions provide VCT facilities and services and create public awareness of VCT availability, and that clients voluntarily seek VCT and make the decision to return for follow-up testing, counselling and referral (Matovu & Makumbi 2007). The process of VCT involves pre-test counselling, followed by an HIV test and post-test counselling. Counselling focuses on the infection (HIV), the disease (AIDS), the test, and positive behaviour change (Mavhandu-Mudzusi, Netshandama & Davhana-Maselesele 2007; Painter 2001). The aims of VCT are, amongst others: (1) motivating individuals to accept the HIV test, (2) detecting HIV-positive individuals and pregnant women, (3) preventing the spread of infection and providing counselling and guidance to achieve goals (2) and (3) (Coovadia 2000; Govender & Schlebusch 2012). The decision to undergo HIV counselling and testing must be entirely voluntary (Njeru, Blystad, Nyamongo & Fylkesnes 2009). Many studies show that knowing one's HIV status, whether positive or negative, is helpful in effecting behaviour change and implementing safer sex practices (Coates 2000; Matovu & Makumbi 2007; Meiberg *et al*. 2008; Painter 2001). Despite relatively

widespread awareness of VCT services, barriers to VCT utilisation still exist (Day *et al*. 2003; Francis 2010). These include doubts about the confidentiality of results, fear about disclosure and stigmatisation, and difficulty in involving partners (Painter 2001; Van Dyk & Van Dyk 2003), VCT should therefore be a key component of any prevention and care programme offered to communities (Mkaya-Mwamburi *et al*. 2000; Serima & Manyenna 2000 in Van Dyk 2005).

The Ndlovu Aids Awareness Programme (NAAP) of the Ndlovu Medical Trust in Elandsdoorn uses VCT in their intervention programme, and has, amongst others, implemented these programmes in the South African province of Limpopo. As in many other provinces in South Africa, the number of HIV-positive persons in Limpopo continues to rise (Dorrington, Bradshaw & Budlender 2002). Estimated HIV prevalence amongst antenatal clinic attendees in Limpopo increased from 20.6% in 2006 to 21.4% in 2009 (Avert 2009).

One of the main goals of NAAP is to encourage VCT so that people are aware of their HIV status and respond appropriately at an early stage. Encouraging people to participate in sport is one way to gain access to teams to expose them to VCT programmes. Through events and visits, NAAP is able to reach a large number of people, yet there is still a significant proportion of individuals that choose not to undergo HIV counselling and testing. It is important to determine what factors influence this test behaviour so that HIV-positive people can be identified at an early stage and HIV and AIDS prevention programmes can be improved.

Theoretical framework

In order to develop effective HIV and AIDS prevention programmes, it is important to have accurate knowledge of how people behave in different situations. It is essential to know when and under what conditions people will be prepared to change their behaviour (Van Dyk 2005). Various theories and models of behaviour change exist. Although these provide a tremendous amount of information that is useful for understanding behaviour and for implementing interventions that will be effective in changing behaviour (Ajzen 1991), there are only a limited number of variables that need to be considered when predicting and understanding behaviour (Fishbein & Yzer 2003).

The theories which include these variables and which are widely used in health behaviour research are described briefly. The first three theories are referred to by Fishbein and Yzer (2003): the health belief model, social cognitive theory and the theory of reasoned action. The fourth important theory, the theory of planned behaviour, is a revision of the theory of reasoned action and is one of the most compelling and accepted conceptual frameworks for human action (Ajzen 1991). The last theory which will be described below is the integrated model of behaviour prediction. This theory integrates important aspects of the four aforementioned theories but also goes beyond these theories by adding important aspects.

The health belief model (HBM) (Janz & Becker 1984; Fishbein & Yzer 2003; Fishbein *et al.* 2003) is a socio-psychological model that attempts to explain and predict health behaviour (e.g. the acceptance of colorectal cancer screening tests) by focusing on the attitudes and beliefs of individuals. Motivation to undertake healthy behaviour is related to perceived susceptibility, severity, benefit and barriers of the behaviour and also to cues to actions (Sung *et al.* 2008). An individual's perceived ability to successfully execute a 'health' strategy, such as using a condom consistently, influences his or her decision and ability to change behaviour and to significantly sustain this change of behaviour (Bandura 1989). When working with adolescents on HIV and AIDS issues, it is important to take the influences of social norms and of peers into account (Wulfert & Wan 1995). The HBM does not recognise these influences on people's decisions concerning their health behaviour.

The second theory, social cognitive theory (SCT) (Bandura 1987) does consider and allow for social influences. This theory acknowledges that the social environment can facilitate or inhibit the performance of behaviour. Consistent with the SCT are two primary factors that determine whether it is likely or not that a person will adopt health-protective behaviour. The person must believe that positive outcomes (benefits) of performing the behaviour outweigh negative outcomes (costs). The person must also have a sense of personal benefit as a result of engaging in health-protective behaviour.

Based on the premise that humans are rational beings and that their behaviour are under volitional control, the third theory, the theory of reasoned action (TRA), conceptually connects individual beliefs, attitudes, intentions and behaviour (Fishbein, Middlestadt & Hitchcock 1994). TRA suggests that executing a given behaviour depends predominantly on the strength of a person's intention to perform that behaviour (Ajzen & Fishbein 1980; Fishbein & Ajzen 1975).

The theory of planned behaviour (TPB) is an extension of the TRA (Ajzen 1991). In the TPB, the variable 'perceived behavioural control' or 'self-efficacy' has been added to the model of TRA to improve the prediction of intention. In this way, the model aims at overcoming situations in which people do not have complete control over their behaviour, such as when emotions influence behaviour. Downs and Hausenblas (2005) gave a description of the TPB whereby behavioural, normative and efficacy beliefs are formed by expectations of people about engaging in behaviour. These beliefs influence attitudes, subjective norms and perceived behavioural control of people's intentions (self-efficacy) and thus, finally, their behaviour. The central factor in the theory is the individual's intention to perform a given behaviour. Intentions are assumed to capture the motivational factors that influence behaviour (Ajzen 1991; Albarracín, Johnson & Zanna 2005).

From the theories described above, Fishbein and Yzer (2003) suggested three critical determinants of a person's intentions and behaviours. The first determinant is the person's *attitude* towards executing behaviour, the second is the *perceived norm,* and the third is *self-efficacy*. These variables have been incorporated into the integrative model of behaviour prediction (IMBP). The IMBP provides a framework for identifying the factors underlying the performance or non-performance of behaviour (Fishbein & Yzer 2003). The components of the TPB as described above by Down and Hausenblas (2005) are similar to those of the IMBP but the IMBP elaborates upon the TPB, as will be explained in Figure 1.

In both the TPB and IMBP the variable *behavioural beliefs* refer to beliefs about the outcomes of behaviour and the evaluation of these outcomes. From these behavioural beliefs a positive or negative *attitude* is formed. If a person believes that undergoing HIV counselling and testing will have a positive outcome on his or her health, attitude will be positive and the intention of committing to VCT will be enforced.

Normative beliefs are thoughts and beliefs about the expectations of people in one's immediate environment. Normative beliefs can place social pressures upon people to meet these expectations. Normative beliefs are called the *subjective norms* which people want to comply with. For example, if a person is positive about undergoing HIV counselling and testing and she or he believes that people around him or her think that participating in VCT is good and that others are not against testing, then the person will probably feel less negative social pressure. The intention to undergo HIV counselling and testing is thus strengthened.

Efficacy beliefs are beliefs about the presence of factors that may facilitate or inhibit the performance of required actions. These beliefs are related to specific situations. Efficacy beliefs will lead to the perceived ease or difficulty of performing the behaviour, which is called *self-efficacy*. If a person feels that it is possible to participate in VCT, feelings of control are strengthened and thus the intention to undergo HIV counselling and testing is enhanced. Both the TPB and the IMBP suggest that combined attitude, subjective norm and self-efficacy form *intention*. Intention is then supposed to be an antecedent of behaviour (Hewstone *et al.* 2007).
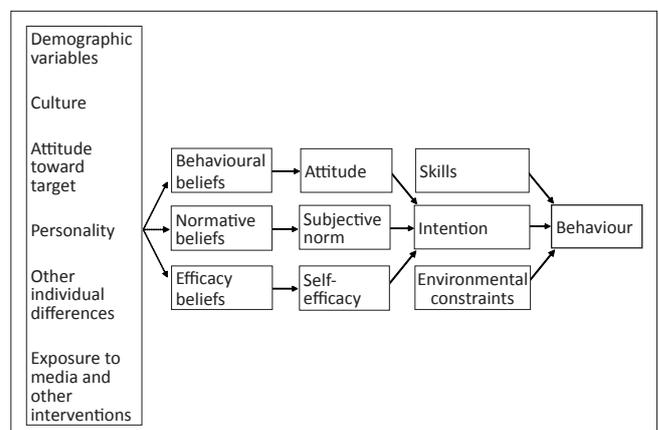
Source: Fishbein & Yzer 2003

FIGURE 1: Integrated model of behaviour prediction.

By adding *skills* and *environmental constraints* to the model, the IMBP is differentiated from the TPB. Even though there may be a strong intention to perform a specific behaviour, there is no guarantee that the person will act on the intention. Two additional factors are required: the necessary skills (for example, knowledge) about appropriate behaviour and the absence of environmental constraints (such as stigma) that can prevent appropriate behaviour (Bond, Chase & Aggleton 2002; Buhi & Goodson 2007; Chesney & Smith 1999; Parker & Aggleton 2003 in Kalichman *et al*. 2005). The chances of a person undergoing HIV counselling and testing increase when she or he has more knowledge about HIV and AIDS and has access to VCT. However, as the stigmatisation of behaviour increases, the likelihood of a person participating in VCT decreases.

The IMBP has been tested in over 50 countries in both the developed and the developing worlds (Fishbein & Yzer 2003). Buhi and Goodson (2007) used the IMBP to better understand why adolescents start sexual activity at early ages. A study of Rhodes *et al*. (2007) examined in detail how components of the IMBP assessed prior to, and immediately after the delivery of an intervention, are associated with reported condom use three months later. Bloksma and Visser (2007) applied the IMBP to study AIDS awareness and VCT behaviour amongst high school students in Limpopo, South Africa.

Several relationships between the variables described in the model were found in different correlational studies. Research done by Conner and McMillan (1999) and Armitage and Conner (Hewstone *et al.* 2007) show a correlation of 0.70 and 0.68 between attitude and intention. Conner and McMillan (1999) found a correlation of 0.55 between subjective norm and intention. According to Ajzen (1991) and Ajzen and Manstead (Bos *et al.* 2007) self-efficacy has the strongest impact on intention. Although there is sufficient evidence for a significant relationship between salient beliefs and attitude, subjective norm and self-efficacy, the causal direction of the relationships is still undetermined (Ajzen 1991).

Relevance of the study and research questions

The first aim of the research was to adapt IMBP guidelines into a reliable and valid questionnaire. The second aim was to assess the ability of the IMBP to predict the intention to undergo HIV testing and/or actually having an HIV test. The questionnaire was applied to sports team members between the ages of 14 to 30 years.

The main question of the research was 'to what degree is it possible to predict VCT behaviour amongst sports team members in Limpopo from the constructs of the integrative model of behaviour prediction?' (Fishbein & Yzer 2003). Based on the assumptions of the IMBP and other research, this study at the outset expected that:

1. Attitude will function as a significant mediator of the effect of behavioural beliefs on the intention to undergo HIV testing.

2. Subjective norms will function as a significant mediator of the effect of normative beliefs on the intention to undergo HIV testing.
3. Self-efficacy will function as a significant mediator of the effect of efficacy beliefs on the intention to undergo HIV testing.
4. Skills (knowledge) will have a positive relationship with behaviour.
5. Intention will have a positive relationship with behaviour.
6. Environmental constraints (stigma) will have a negative influence on behaviour.

Methods

Participants

The current study consisted of a sample of 92 sports team members, of whom 69 (75%) were male and 23 (25%) female, with an age range of 14 to 30 years. The mean age was 17.77 (SD = 3.02). All were invited to participate by their sports team coaches. Those who were willing to do so could come to one of five organised research meetings.

Instruments

A questionnaire based upon the integrated model of behaviour prediction (IMBP) was used. Previous researchers had already developed a questionnaire based on this model (Bloksma & Visser 2007; Van Geleuken & Van Dam 2007). The results of Bloksma and Visser (2007) show that 61.4% of the variance in intention of participating in VCT was explained by six predictors (behavioural beliefs, attitude, normative beliefs, subjective norm, efficacy beliefs and self-efficacy) of the model they examined. These scales turned out to be sufficiently reliable (Cronbach Alpha > 0.6, item-total correlations > 0.2), although it was noted that some scales could be improved.

In the current study, the questionnaire of Bloksma and Visser (2007) was used in a pilot study to optimise the reliability and validity of the study questionnaire. An item analysis was done on the questionnaire based on Bloksma and Visser's (2007) results. Questions were deleted in the questionnaire for use in the current research when the item decreased the internal consistency estimates (Cronbach Alpha) or had low item discrimination ability (i.e. a low item-total correlation). The wording and formatting of questions were also changed if they were deemed ambiguous or too verbose. After the changes, the questionnaire consisted of 81 questions.

The questionnaire was divided into five parts. The first part contained skills (knowledge) questions. An example of a skills (knowledge) question would be: 'are HIV and AIDS spread by kissing?' Part two contained statements to measure *behavioural beliefs* ('I can take my life more serious when I undergo VCT'), *attitude* ('I think VCT is nonsense'), *normative beliefs* ('undergoing VCT is important for my family'), *subjective norms* ('if my religion tells me to undergo VCT, I will do that) and *intention* ('I'm going to undergo VCT'). Part three focused on environmental constraints

(*stigma*), for example; 'people who have AIDS are dirty'. Part four consisted of questions covering the *self-efficacy* scale ('undergoing VCT depends on having knowledge of HIV and AIDS'), and part five was about the *efficacy beliefs* scale ('the possibility of getting medicine'). Behaviour refers to whether the person reported that she or he did or did not undergo HIV testing.

Part one of the questionnaire required dichotomous answers (yes or no) whilst the other parts utilised a five-point Likert scale.

Design

Intention and *behaviour* regarding undergoing HIV counselling and testing were the dependent variables in this research. The independent variables were *behavioural beliefs, attitude, normative beliefs, subjective norm,* efficacy beliefs, *self-efficacy, skills* (knowledge) and *environmental constraint*s (stigma). *Intention* was an independent variable in relation to *behaviour*. The dependent and independent variables covered all constructs in the IMBP.

Procedure

Members of several sports teams completed the questionnaire in a room at the Sport Grounds, Elandsdoorn. All respondents sat at tables in small groups (approximately six persons). Before they started, the researchers introduced themselves and informed the respondents why they were being requested to complete the questionnaire, that there were no wrong answers and that it was important to complete the questionnaire individually. If someone had a question, they could raise their hands for assistance. The researchers directly observed the participants completing the questionnaires and provided assistance where necessary.

The questionnaire was checked upon completion. Persons were allowed to complete the question or correct errors if omissions or mistakes were found. Afterwards they could keep the pen and leave the room. It took the participants about 45 minutes to complete the questionnaire.

Data analysis

The software programme SPSS was used to analyse the data. Prior to analysis, a reliability analysis was conducted investigating internal consistency (Cronbach Alpha). Questions that decreased reliability and had an item-total correlation of less than 0.2, thus not contributing meaningfully to a subscale, were deleted before analysing the data.

The IMBP consisted of several mediator variables, for example; the variable *behavioural beliefs* are a predictor of *intention*, mediated by *attitude*, thus, *behavioural beliefs* to *attitude* to *intention*. Because of the assumed mediation effect in the theoretical model, the first, second and third hypotheses were tested following the mediator analysis methodology developed by Baron and Kenny (1986). Three variables were

included in the mediator analysis: the predictor variable X, the outcome variable Y, and the mediator variable M. According to Baron and Kenny (1986), four conditions are necessary for assessing a mediation effect: (1) the independent variable (X) should correlate significantly with the mediator, (2) the mediator should correlate significantly with the dependent variable (Y), (3) the relationship between X and Y must be reduced significantly when one controls for the influence of the mediator, and (4) if the relationship between X and Y is not 0 then a mediator is present along with other influences, that is, partial mediation is present.

Frazier, Tix and Barron (2004) suggested a three-step process for evaluating mediation with multiple regression: (1) show that X is a significant predictor of Y, using regression, (2) show that X is a significant predictor of M using regression, and (3) show that M is a significant predictor of Y, when one controls for X. To achieve this, a multiple regression is carried out using X and M as predictors, and Y as the outcome. If M is a complete mediator of the relationship between X and Y, the effect of X, when controlling for M, should be zero. If it is only a partial mediator the effect will be merely reduced and not eliminated.

The fourth, fifth and sixth hypotheses postulated a relationship between the dependent (*behaviour*) and independent *skills* (*knowledge*), *intention* and *environmental constraints* (*stigma*) variables. These hypotheses were tested by means of Mann-Whitney tests because of having a dichotomised dependent variable.

Results

Reliability analysis on the constructed scales

Five of the seven scales of Bloksma and Visser (2007) were improved, probably due to the changes in the wording and formatting of questions and deletion of the poorly functioning questions. In addition to improving the reliability of the scales, this study also added two constructs, namely, *skills* (knowledge) and *environmental constraints* (stigma). These scales turned out to be reliable as well (Cronbach alpha > 0.60). However, the reliability of the *subjective norm* and *self-efficacy* scales decreased. Although the subscale included exactly the same items as in previous research, a possible explanation for the decreased reliability of the *subjective norm* scale is differences in the original and current target groups. The target group of Bloksma and Visser (2007) consisted of high school students who were also core group members (trainees) of the NAAP team ($N = 85$), which means that they were probably very motivated and familiar with the terminology of HIV and AIDS-related subjects. They may have understood the questions better than the sample of the current study. The estimated reliability of the *self-efficacy* scale probably decreased because of a change in statements (Table 1). Although the content of the statements remained similar, all statements within this subscale were posed differently. For example, 'It would depend on being scared of telling your family when you are HIV positive' was changed

to 'Undergoing VCT depends on being scared of telling your family when you are HIV positive'. In general, the results showed good internal consistency estimates for each of the IMBP-subscales (Table 1). The average item-total correlations for all but three scales were > 0.30. The scales *self-efficacy*, *attitude* and *skills* (knowledge) yielded average item-total correlations of > 0.20.

Mediator Analyses

In light of the assumed mediation effect in the theoretical model, three mediator analyses were done, based on the steps explicated by Baron and Kenny (1986) and Frazier *et al.* (2004).

To test the first mediation effect of attitude on the association of behavioural beliefs with intention, the first regression concerned the influence of behavioural beliefs on intention, followed by a second regression of behavioural beliefs on attitude. The last regression examined attitude and intention.

Table 2 shows a positive significant relation between *behavioural beliefs* (X) and *intention* (Y) ($\beta = 0.76$, $p \leq 0.001$). There is no statistically significant relation between *behavioural beliefs* and *attitude* (M) ($\beta = 0.18$, $p \geq 0.05$). There is also no relationship between *attitude* and *intention* ($\beta = 0.12$, $p \geq 0.05$). When *attitude* was introduced into the model, the relation between *behavioural beliefs* and *intention* remained statistically significant ($\beta = 0.74$, $p \leq 0.001$). Therefore, Table 2 does not show a partial mediation effect of *attitude* in the path of *behaviour beliefs* and *intention*. The slight reduction in β-values from path X to Y (0.76) to path X to Y with mediation (0.74) is not significant according to Sobel's test (Baron & Kenny 1986).

To test the second mediation effect of *subjective norm* in the relationship between *normative beliefs* and *intention*, the first regression done was *normative beliefs* on *intention*, followed by a second regression of *normative beliefs* on *subjective norm*. The last regression was *subjective norms* on *intention*.

Table 3 shows a positive significant relation between *normative beliefs* (X) and *intention* (Y) ($\beta = 0.71$, $p \leq 0.001$). There is no statistically significant relation between *normative beliefs* (X) and *subjective norms* (M) ($\beta = 0.01$, $p \geq 0.05$) and between *subjective norms* (M) and *intention* (Y) ($\beta = 0.03$, $p \geq 0.05$). When *subjective norms* (M) was introduced into the model, the relation between *normative beliefs* (X) and *intention* (Y) remained statistically significant ($\beta = 0.71$, $p \leq 0.001$). Therefore, Table 3 does not show a partial mediation effect of *subjective norms* in the path of *normative beliefs* and *intention*.

To test the third mediation effect of *self-efficacy* on the association of *efficacy beliefs* with *intention*, the first regression was *efficacy beliefs* on *intention*, followed by a second regression of *efficacy beliefs* on *self-efficacy*. The last regression was *self-efficacy* on *intention*.

Table 4 does not show a statistically significant relation between *efficacy beliefs* (X) and *intention* (Y) ($\beta = 0.11$, $p \geq 0.05$).

There is a statistically significant negative relation between *efficacy beliefs* (X) and *self-efficacy* (M) ($\beta = -0.50$, $p \leq 0.001$). *Self-efficacy* (M) and *intention* (Y) have a positive relation ($\beta = 0.27$, $p \leq 0.05$). When *self-efficacy* (M) was introduced into the model, the relation between *efficacy beliefs* (X) and *intention*

TABLE 1: Reliability analysis on constructed scales using Cronbach's Alpha: Research of Bloksma and Visser (2007) ($N = 85$) and current ($N = 92$) study.

Construct	Bloksma and Visser (2007)		Current study	
	Cronbach Alpha	Number of items	Cronbach Alpha	Number of items
Behavioural beliefs	0.73	8	0.83	9
Attitude	0.65	9	0.67	9
Normative beliefs	0.61	8	0.77	8
Subjective norm	0.80	4	0.63	4
Efficacy beliefs	0.72	11	0.85	11
Self-efficacy	0.79	16	0.67	16
Environmental constraints (stigma)	-	-	0.83	9
Skills (knowledge)	-	-	0.63	11
Intention	-	-	0.87	6

TABLE 2: Mediator analysis of behavioural beliefs, attitude and intention.

Steps	Variable	B	SE B	B	Adjusted R^2
Step 1					
Outcome	Intention	-	-	-	-
Predictor	Behavioural beliefs	0.98	0.09	0.76***	0.58
Step 2					
Outcome	Attitude	-	-	-	-
Predictor	Behavioural beliefs	0.16	0.09	0.184	0.02
Step 3					
Outcome	Intention	-	-	-	-
Mediator	Attitude	0.18	0.10	0.123	-
Predictor	Behavioural beliefs	0.95	0.09	0.737***	0.58

*, $p \leq 0.05$; **, $p \leq 0.01$; ***, $p \leq 0.001$.

TABLE 3: Mediator analysis of normative beliefs, subjective norm and intention.

Steps	Variable	B	SE B	B	Adjusted R^2
Step 1					
Outcome	Intention	-	-	-	-
Predictor	Normative beliefs	0.91	0.10	0.709***	0.5
Step 2					
Outcome	Subjective norm	-	-	-	-
Predictor	Normative beliefs	−0.01	0.13	−0.007	0.00
Step 3					
Outcome	Intention	-	-	-	-
Mediator	Subjective norm	0.03	0.08	0.030	-
Predictor	Normative beliefs	0.91	0.10	0.710***	0.49

*, $p \leq 0.05$; **, $p \leq 0.01$; ***, $p \leq 0.001$.

TABLE 4: Mediator analysis of efficacy beliefs, self-efficacy and intention.

Steps	Variable	B	SE B	B	Adjusted R^2
Step 1					
Outcome	Intention	-	-	-	-
Predictor	Efficacy beliefs	0.14	0.13	0.107	0
Step 2					
Outcome	Self-efficacy	-	-	-	-
Predictor	Efficacy beliefs	−0.38	0.07	−0.504***	0.25
Step 3					
Outcome	Intention	-	-	-	-
Mediator	Self-efficacy	0.45	0.2	0.270*	-
Predictor	Efficacy beliefs	0.31	0.15	0.243*	0.05

*, $p \leq 0.05$; **, $p \leq 0.01$; ***, $p \leq 0.001$.

(Y) became statistically significant (β = 0.24, $p \leq 0.05$). Table 4 does not show a (partial) mediation effect of *self-efficacy* on the relationship between *efficacy beliefs* and *intention.* However, *self-efficacy* has an opposite effect. By introducing s*elf-efficacy*, the predictive validity of *efficacy beliefs* increased. There seems to be a suppressor effect, which means that *self-efficacy* is a suppressor variable.

The difference between VCT exposed and non-VCT groups on knowledge, intention and stigma variables

The mean of the subscale *skills* (knowledge) was 8.67 (SD = 1.85) for the group that participated in VCT (*n* = 23) and 8.48 (SD = 1.83) for the group that did not (n = 69). The Mann-Whitney test showed that respondents who underwent HIV counselling and testing had a slightly higher score on the *skills* (knowledge) subscale compared to the group that did not, but the mean difference did not turn out to be significant (U = 742.5, z = −0.47, p = 0.64, r = −0.05) (see Table 5).

The mean of the subscale *intention* was 23.35 (SD = 6.69) for the group that underwent HIV counselling and testing and 22.52 (SD = 6.16) for the group that did not participate in VCT. On average, respondents who underwent HIV counselling and testing had a higher score on *intention* compared to the group that did not, but this difference was not significant (U = 761.5, z = −0.29, p = 0.77, r = −0.03) (see Table 5).

The mean of the scale *environmental constraints* (stigma) was 36.09 (SD = 10.53) for the group that participated in VCT and 37.10 (SD = 7.50) for the group that did not. Respondents who underwent HIV counselling and testing had a lower score on the *environmental constraints* (stigma) scale, which suggests that the stigma in this group was smaller than in the group that did not undergo HIV counselling and testing. However this difference was not significant (U = 743.5, z = −0.45, p = 0.65, r = −0.05) (see Table 5).

Ethical considerations

Permission to conduct the study was obtained from Dr H. Tempelman (Medical Director of the Ndlovu Medical Centre). Participants were given the opportunity to fill in the questionnaire anonymously and they gave their consent to utilise the results for research. The consent of minors was obtained by their sport coaches and with parental approval. The data was used only for the research on AIDS awareness and VCT behaviour and participants cannot be identified in any manner.

Discussion

This study examined the possibility of predicting VCT behaviour amongst sports team members in Limpopo from the constructs of the integrative model of behaviour prediction (IMBP) (Fishbein & Yzer 2003). The purpose of the IMBP is to explain specific behaviour. In this study, by adapting and applying a questionnaire based on the IMBP, the whole model was used to predict VCT behaviour, namely, undergoing or not undergoing HIV counselling and testing. If one understands in what way factors contribute to the decision-making process concerning VCT behaviour, HIV and AIDS prevention programmes can be adapted to account for these factors and in the process, reduce the increasing number of HIV-positive victims. The adapted questionnaire was found to be reliable and could therefore be used to verify the relations between the constructs of the IMBP.

The primary hypothesis was that attitude will be a significant mediator between behavioural beliefs and the intention to undergo HIV testing. Results did not support this hypothesis. The results indicated that attitude had no mediating effect. However, there was a positive significant relation between behavioural beliefs and intention of undergoing VCT. This implies that beliefs about the likely consequences of a person's behaviour and the evaluation of these outcomes are important in predicting the intention to undergo HIV counselling and testing, but this is not mediated by attitude. Bloksma and Visser (2007) found the same relation between the three constructs in their research about test behaviour amongst high school students who received information about HIV, AIDS and VCT from the NAAP team.

The second hypothesis stated that subjective norms will function as a significant mediator of the effect of normative beliefs on the intention to undergo HIV testing. However, the findings were not consistent with this expectation. Subjective norms had no mediation effect. Results showed a significant positive relation between normative beliefs and intention. Thus, thoughts and beliefs about the expectations other people have is an immediate predictor of the intention to undergo VCT, but these thoughts and beliefs do not lead to social pressure (subjective norm). Not experiencing social pressure is possibly due to the fact that intention is an internal or subjective factor because nobody has to know whether or not a person wants to undergo HIV counselling and testing. It is more likely that social pressure will be experienced when one advertises one's intention to undergo HIV counselling and testing or not to do so.

TABLE 5: Results of Mann-Whitney tests between groups that did and did not do a VCT for variables knowledge, intention and environmental constraints (*n* = 92)

Subscale	Done a VCT (*n* = 23)		Never done a VCT (*n* = 69)		U	z	r
	Mean rank	Median	Mean rank	Median			
Skills (knowledge)	44.28	8.48	47.24	8.67	742.5	−0.47	−0.05
Intention	45.11	3.83	46.96	3.89	761.5	−0.29	−0.03
Environmental constraints (stigma)	44.33	3.61	47.22	3.76	743.5	−0.45	−0.05

U, test statistic for Mann-Whitney test; z, significant level of test, r, effect size.
VCT, voluntary HIV counselling and testing.

The third hypothesis was that self-efficacy will function as a significant mediator of the effect of efficacy beliefs on the intention to undergo HIV testing. The outcome of testing this hypothesis was noteworthy. Self-efficacy had no mediator effect, but there seemed to be an opposite or suppressor effect. Results showed that there was no statistically significant relation between efficacy beliefs and intention. However, when self-efficacy was included, the relation between efficacy beliefs and intention became statistically significant. Thus, if a person believes that there are factors that might facilitate undergoing HIV counselling and testing (efficacy beliefs), the intention is only high if one believes one can execute the VCT behaviour (self-efficacy). However, besides this finding, there was an interesting result concerning the relation between efficacy beliefs and self-efficacy: instead of the hypothesised positive relation, there was a significant negative relation. Self-efficacy and intention have a significant positive relation. To summarise, self-efficacy had no mediating effect but had a suppressor effect whilst the relationship between efficacy beliefs and self-efficacy was negative. This hypothesis is thus disconfirmed and this finding supports that of Bloksma and Visser's (2007) study about VCT behaviour amongst high school students.

The fourth hypothesis stated that skills (knowledge) will have a positive relationship with behaviour. One could thus say that undergoing HIV counselling and testing does not depend on the knowledge a person has about HIV and AIDS. Although it intuitively makes sense that sufficient knowledge about HIV and AIDS would make people want to undergo testing, it is also possible that knowledge increases awareness about HIV infection and that this could increase fear and therefore deter people from HIV testing (Swanepoel 2003).

The fifth hypothesis stated that intention will have a positive relationship with behaviour, because intention is supposed to be an antecedent of behaviour (Hewstone *et al.* 2007). This study did not support this assumption. A relationship was found but it was not significant. The fifth hypothesis must then be rejected. Even though a person might have the intention to participate in VCT, this does not automatically lead to actual testing. Cognitive and personality variables are factors that can play an important role for persons to engage in certain behaviours (Sheeran 2002). There might also be other barriers (aside from stigma) that may need to be overcome before a person is ready for testing. An example of such a barrier can be fear of the physical, mental and economic consequences if one turns out to be HIV positive (Swanepoel 2003).

In the final hypothesis, it was stated that environmental constraints (stigma) will have a negative influence on behaviour. Even though there is a relationship between environmental constraints (stigma) and behaviour, it was not a significant negative relation, and thus this hypothesis is rejected. A possible explanation of this result could be the way in which environmental constraints (stigma) were examined. In this research environmental constraints (stigma) were measured by asking what respondents thought of people with HIV or AIDS. There were no questions about possible perceived stigma. It is quite possible that there might be a relation between environmental constraints (stigma) and testing if the perceived stigma was measured (Babalola 2006; Roa *et al.* 2008).

Practical implications

Altogether, this study gave new insights into the way important predictors are related to intention and VCT behaviour and may be used to adjust HIV and AIDS prevention programmes. Intervention programmes can take into account that important predictors of the intention of undergoing HIV counselling and testing are people's beliefs about the likely consequences of test behaviour and the expectations of other people about testing. Besides this, people must also perceive themselves as able to participate in VCT. It is important to realise that disseminating a lot of information about HIV and AIDS does not guarantee testing and can even deter people from undergoing HIV counselling and testing. It is also essential to be aware that other variables, such as fear, can form a barrier between intention and testing. Thus, it is important to give information not only about how to prevent the spread of HIV (with, for example, condom use) but also about what a person can do if their status is HIV positive.

Research limitations

Some remarks can be made with respect to potential limitations of the current study. Firstly, the sample size of this study (N = 92) was small and the sample was not representative. The initial aim was to obtain a sample of high school children, but school exams were delayed because of previous strikes and the children had no time to complete the survey. The current study was therefore obliged to focus on a smaller, more restricted group, namely, sports team members. Thus, one must be careful to generalise the results. One must also take into account the number of men (75%) and women (25%) included in this sample. According to several researchers, there is a gender difference concerning behavioural and psychosocial predictors of HIV testing (Babalola 2006; Maman *et al.* 2001; Stein & Nyamathi 2000). For example; women are more likely to discuss HIV testing with their partners, whilst men make these decisions independently (Maman *et al.* 2001). In contrast to women, men judged their risk of HIV infection to be significantly lower (Stein & Nyamathi 2000). Gender differences should be kept in mind when developing HIV and AIDS intervention programmes.

Social desirability could also have influenced the results. HIV and AIDS is, after all, a sensitive topic (Babalola 2006). This study strived to avoid socially desirable responses by allowing participants to complete the questionnaire individually and restricting communication between them. It was also not obligatory to provide names.

Another possible limitation is the English language comprehension ability of participants. The current study omitted persons who did not understand English, but it is still possible that some questions were not understood well, with English not being the mother tongue of most of the respondents. One thus runs the risk of obtaining unreliable responses, but at least the questionnaire was 'standardised' on one language because ensuring equivalency amongst eleven official languages is linguistically very difficult. By making the questions as simple as possible without losing the meaning of the question, it was still possible to get useful answers from the target group.

Another comment can be made about the way the respondents interpreted the questions. Before the actual research was done, a few NAAP members went through the questionnaire. It was noticeable that some respondents found it difficult to generalise situations depicted in the questions. For example, the question 'Can women give HIV to men?' was answered negatively because the respondents did not have empirical experience of such a situation, even though it is possible in principle. Thus, limited experiential rather than theoretical knowledge could have biased the results.

Recommendation and suggestions for further research

A suggestion for future research is to examine the IMBP for predicting HIV and AIDS preventative behaviour by including additional variables (such as *fear*) in empirical testing of the model. Another variable to be examined would be *gender* because it is suspected that the responses of women and men differ. Larger and representative samples are also required to ensure the stability of the relationship between variables in the model. Larger samples would also mean that refined methods of structural equation modelling can be used. Further, it would be interesting to use the questionnaire for longitudinal research where, for example, predictors of VCT behaviour among people who had not yet undergone HIV counselling and testing are measured before and after they receive information about HIV, AIDS and VCT from the NAAP team. Thus, one could determine what impact the information has on test behaviour.

Conclusion

In conclusion, it is partly possible to predict VCT behaviour amongst sports team members in Limpopo from the constructs of the IMBP. Some constructs do influence the intention and VCT behaviour, but mostly not in the way the model depicts. The findings of this study and previous research (Bloksma & Visser 2007) call into question the adequacy of the IMBP to predict HIV and AIDS preventative behaviour.

Acknowledgements

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